Department of Energy
Carlsbad Field Office
P. O. Box 3090
Carlsbad, New Mexico 88221

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NMED Hazardous
Waste Bureau

Mr. Steve Zappe, WIPP Project Leader
Hazardous Waste Permits Program
New Mexico Environment Department
2905 E. Rodeo Park Drive, Bldg. 1
Santa Fe, NM 87505

Subject: Transmittal of Approved RFETS WSPF Number RF 104.01 Mixed Glass Debris (S5000)

Dear Mr. Zappe:

The Department of Energy, Carlsbad Field Office (CBFO) has approved the Rocky Flats Environmental Technology Site (RFETS) Waste Stream Profile Form (WSPF) RF 104.01

Enclosed is a copy of the approved form as required by Section B-4(b)(1) of the WIPP Hazardous Waste Facility Permit, No. NM4890139088-TSDF.

If you have any questions on this matter, please contact me at (505) 234-7357 or (505) 706-0066.

Sincerely,

Kerry W. Watson
CBFO Assistant Manager
Office of National TRU Program

Enclosure

cc: w/o enclosure
J. Kieling, NMED
C. Walker, TechLaw
M. Strum, WTS *ED
R. Chavez, WRES *ED
L. Greene, WRES
S. Calvert, CTAC *ED
WIPP Operating Record
CBFO M&RC

*ED denotes Electronic Distribution

040501

CBFO:NTP:KWW:VW:04-1409:UFC:5822

WIPP WASTE STREAM PROFILE FORM

Waste Stream Profile Number: RF104.01

Generator site name: RFETS | Technical contact: Eric D'Amico

Generator site EPA ID: CO7890010526 | Phone number: (303) 966-5362

Date of audit report approval by NMED: March 9, 2000 as amended February 6, 2001; May 24, 2001; June 5, 2001; April 5, 2002; April 8, 2002; August 20, 2002; August 29, 2002; December 20, 2002; April 8, 2003; September 19, 2003; and December 30, 2003

Title, version number, and date of documents used for WAP certification: Rocky Flats Environmental Technology Site TRU Waste Characterization Program Quality Assurance Project Plan, 95-QAPjP-0050, Version 9, February 2004. Transuranic (TRU) Waste Management Manual, Version 7, 1-MAN-008-WM-001, February 2004. Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant, Revision 1, March 2004.

Did your facility generate this waste? ☑ Yes ☐ No If no, provide the name and EPA ID of the original generator:

Waste Stream Information[1]

WIPP ID: RF104.01[3]

Summary Category Group: S5000[3] | Waste Matrix Code Group: Inorganic Non-Metal Waste[3]

Waste Stream Name: TRM Glass Debris Waste (D005, D008, D009, D022, F001, F002, F005)[3]

Description from the WTWBIR: This waste consists of glass from analytical laboratories, recovery processes, ceramics, glovebox windows, crushed glass light bulbs, and leaded glass.

Defense TRU Waste: ☑ Yes ☐ No

Check one: ☑ CH ☐ RH Number of SWBs 6 Number of Drums 221 Number of Canisters N/A

Batch Data Report numbers supporting this waste stream characterization: See Table 7.

List applicable EPA Hazardous Waste Codes[2]: Numbers D005, D008, D009, D022, F001, F002, F005

Applicable TRUCON Content Codes: RF 118A/218A, RF 118B/218B, RF 118C/218C, RF 118D/218D, RF 118E/218E, RF 118F/218F, RF 118H/218H, RF 118I/218I, RF 118N/218N, RF 118T/218T

Acceptable Knowledge Information[1]

Required Program Information

- Map of site: Reference List, No. 4
- Facility mission description: Reference List, No. 4
- Description of operations that generate waste: Reference List, Nos. 1, 2, 3, 4, 7
- Waste identification/categorization schemes: Reference List, Nos. 9, 10
- Types and quantities of waste generated: Reference List, Nos. 1, 2, 3, 4, 7
- Correlation of waste streams generated from the same building and process, as appropriate: Reference List, Nos. 1, 2, 3, 7
- Waste certification procedures: Reference List, No. 6

Required Waste Stream Information

- Area(s) and building(s) from which the waste stream was generated: Reference List, Nos. 1, 2, 3, 7
- Waste stream volume and time period of generation: Reference List, Nos. 5, 7
- Waste generating process description for each building: Reference List, Nos. 1, 2, 3, 7
- Process flow diagrams: Reference List, Nos. 1, 2, 3
- Material inputs or other information identifying chemical/radionuclide content and physical waste form: Reference List, Nos. 1, 2, 3, 4, 7
- Which Defense Activity generated the waste: (Check one) Reference List, No. 4

☑ Weapons activities including defense inertial confinement fusion
☐ Naval Reactors development
☐ Verification and control technology
☐ Defense research and development
☐ Defense nuclear waste and material by products management
☐ Defense nuclear materials production
☐ Defense nuclear waste and materials security and safeguards and security investigations

Supplemental Documentation:

- Process design documents: Note 4
- Standard operating procedures: Note 4
- Safety Analysis Reports: Note 4
- Waste packaging logs: Note 4
- Test plans/research project reports: Note 4
- Site data bases: Note 4
- Information from site personnel: Note 4
- Standard industry documents: Note 4
- Previous analytical data: Note 4
- Material safety data sheets: Note 4
- Sampling and analysis data from comparable/surrogate Waste: Note 4
- Laboratory notebooks: Note 4

Sampling and Analysis Information[1]

[*For the following, when applicable, enter procedure title(s), number(s) and date(s)*]

☑ Radiography: Reference List Nos. 14, 15, 20
☑ Visual Examination: 12, 13, 17, 18, 19, 21, 22
☑ Headspace Gas Analysis
VOCs: Reference List, No. 8, 16, 23
Flammable: Reference List, No. 8, 16, 23
Other gases (specify): N/A
☐ Homogeneous Solids/Soils/Gravel Sample Analysis **(Tables 1, 3, 4, and 5 are not applicable and not included)**
Total metals: N/A
PCBs: N/A
VOCs: N/A
Nonhalogenated VOCs: N/A
Semi-VOCs: N/A
Other (specify): N/A

Waste Stream Profile Form certification:

I hereby certify that I have reviewed the information in this Waste Stream Profile Form, and it is complete and accurate to the best of my knowledge. I understand that this information will be made available to regulatory agencies and that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Signature of Site Project Manager	G. A. O'Leary, Manager TRU Programs Printed Name and Title	Date 4/28/04
Signature of Site QA Officer	C. L. Ferrera, TWCP Site QAO Printed Name and Title	Date 4/28/04

NOTE (1) Use back of sheet or continuation sheets, if required.

(2) EPA Hazardous Waste Codes were determined using acceptable knowledge and confirmed using headspace gas sampling and analysis (see attached Characterization Information Summary documenting this determination).

(3) This waste stream differs only in hazardous waste codes from the following waste streams that are identified in the WTWBIR: RF-MT0440, RF-MT0442, RF-MT0444, and RF-MT0855. The WIPP ID assigned corresponds to the Waste Stream Profile Number. The Summary Category Group, Waste Matrix Code Group, and Waste Stream Name are based on acceptable knowledge (see attached AK Summary). The BIR ID reported in WWIS is assigned using standard BIR conventions for those containers that do not have a valid BIR ID in the WTWBIR.

(4) See the References section in the Acceptable Knowledge Summary (attached) for additional backup documentation associated with this waste stream.

REFERENCE LIST

1. Backlog Waste Reassessment Baseline Book, Waste Form 17, Glass, Ground Glass, and Plexiglas, February 2004.
2. Backlog Waste Reassessment Baseline Book, Waste Form 27, Fluorescent Bulbs, February 2004.
3. Waste Stream and Residue Identification and Characterization (WSRIC), Version 7, February 2004, and archived versions.
4. RFETS TRU Waste Acceptable Knowledge Supplemental Information, RF/RMRS-97-018, Revision 11, January 2004.
5. Waste and Environmental Management System (WEMS) database.
6. Transuranic (TRU) Waste Certification, PRO-X05-WC-4018, Revision 4, May 2002.
7. Acceptable Knowledge TRU/TRM Waste Stream Summaries, RMRS-WIPP-98-100, Section 7.18, Revision 0, April 2004.
8. GC/MS Determination of Volatile Organics Waste Characterization, L-4111-X, January 2002.
9. Waste Characterization, Generation, and Packaging, 1-PRO-079-WGI-001, Revision 4, May 2002.
10. Waste Characterization Program Manual, 1-MAN-036-EWQA-Section 1.6.1, Revision 3, May 2002.
11. Interoffice Memorandum from Douglas K. Sullivan to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile RF104.01 Lot 1, DKS-008-04, April 2004.
12. Visual Examination for Confirmation of RTR, 4-H80-776-ASRF-007, Revision 5, June 2001.
13. TRU/TRM Waste Visual Verification (V^2) and Data Review, PRO-1031-WIPP-1112, Revision 2, February 2003.
14. Real-Time Radiography Testing of Transuranic and Low-Level Waste, 4-W30-NDT-00664, Revision 5, October 2001.
15. Real-Time Radiography Testing of Transuranic and Low-Level Waste in Building 569, 4-I19-NDT-00569, Revision 6, January 2002.
16. Headspace Gas Sampling And Analysis Using An Automated Manifold, L-4231-F, March 2002.
17. Visual Examination for Confirmation of RTR, PRO-1471-VE-771, Revision 0, November 2001.
18. Glovebox and C-Cell Waste Operations, PRO-1358-440-VERP, Version 5, February 2004.
19. RTR Visual Examination Confirmation, Building 371, PRO-1608-VECRTR-371, Revision 0, October 2002.
20. Mobile Real-Time Radiography Testing of Transuranic and Low-Level Waste, PRO-1520-Mobile-RTR, Revision 0, May 2002.
21. Residue Repack, Building 371; PRO-544-SALT REPACK-371, Revision 5, January 2002.
22. Combustible Residue Repackaging, PRO-823-REPACK-371, Revision 1, March 2001.
23. Headspace Gas Sampling and Analysis Using An On-Line Integrated System, PRO-1676-HGAS-S&A, Version 2, January 2004.

Form A
Reconciliation with Data Quality Objectives

I certify by signature (below) that sufficient data have been collected to determine the following Program-required waste parameters:

WSPF # RF104.01

Item	Check Box[a]	Reconciliation Parameter
1	✓	Waste Matrix Code as reported in WEMS.
2	✓	Waste Material Parameter Weights for individual containers as reported in WEMS.
3	✓	The waste matrix code identified is consistent with the type of sampling and analysis used to characterize the waste.
4	✓	Container mass and activities of each radionuclide of concern as reported in WEMS.
5	✓	Each waste container of waste contains TRU radioactive waste.
6	✓	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, and the number of samples collected for each VOC in the headspace gas of waste containers in the waste stream/waste stream lot.
7	N/A	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, and number of samples collected for VOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
8	N/A	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, number of samples collected for SVOCs in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
9	N/A	Mean concentrations, UCL_{90} for the mean concentrations, standard deviations, and number of samples collected for metals in the waste stream/waste stream lot. Summary Categories S3000 and S4000.
10	N/A	Sufficient number of samples was taken to meet statistical sampling requirements.
11	✓	Only validated data were used in the above calculations, as documented through the site data review and validation forms and process.
12	✓	Waste containers were selected randomly for sampling, as documented in site procedures.
13	✓	The potential flammability of TRU waste headspace gases.
14	✓	Sufficient number of waste containers was visually examined to determine with a reasonable level of certainty that the UCL_{90} for the miscertification rate is less than 14 percent.
15	✓	Whether the waste stream exhibits a toxicity characteristic (TC) under 40 CFR Part 261, Subpart C.
16	✓	All TICs were appropriately identified and reported in accordance with the requirements of the WIPP WAP prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
17	✓	The overall completeness, comparability, and representativeness QAOs were met for each of the analytical and testing procedures as specified in the WIPP WAP Sections B3-2 through B3-9 prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
18	✓	The RTLs (i.e., PRQLs) for all analyses were met prior to submittal of a waste stream profile form for a waste stream or waste stream lot.
19	✓	Appropriate packaging configuration and DAC were met and documented in the headspace gas sampling documentation and the drum age was met prior to sampling.
20	✓	Whether the waste stream can be classified as hazardous or non-hazardous at the 90-percent confidence limit.

[a] Check (✓) indicates that data or acceptable knowledge are sufficient to determine the waste parameters and that the waste parameters have been reported in the listed document or database. N/A indicates parameter does not apply to waste stream; NO indicates data are insufficient.

Signature of Site Project Manager — G. A. O'Leary, Printed Name — 4/28/04, Date

Data Summary Report—Table 2: Headspace Gas Summary Data

WSPF # RF104.01

Sampling and Analysis Method (check one):

☑ 100% Sampling ☐ Reduced Sampling

2A

ANALYTE[a]	# Samples[b]	Transform Applied[c]	Normality Test (Pass/Fail)[d]	Mean[d]	UCL_{90}[d]	Transformed RTL[e]	Un-Transformed RTL[e] (ppmV)	EPA Code[f]
1,1-Dichloroethane	0			0.70			10	
1,2-Dichloroethane	0			0.73			10	
1,1-Dichloroethylene	0			0.83			10	
cis-1,2-Dichloroethylene	0			0.71			10	
trans-1,2-Dichloroethylene	0			0.99			10	
1,1,2,2-Tetrachloroethane	0			0.80			10	
1,1,1-Trichloroethane	4	Log	Fail[h]	-0.256	0.068	2.303	10	
1,1,2-Trichloro-1,2,2-Trifluoroethane	1	Sq. Rt.	Fail[h]	0.863	0.965	3.162	10	
1,2,4-Trimethylbenzene	0			0.84			NA	
1,3,5-Trimethylbenzene	0			0.85			NA	
Acetone	3	Sq. Rt.	Pass	2.915	3.188	10	100	
Benzene	2	Log	Fail[h]	-0.342	-0.172	2.303	10	
Bromoform	0			0.76			10	
Butanol	0			10.04			100	
Carbon disulfide	1	Log	Fail[h]	-0.317	-0.09	2.303	10	
Carbon tetrachloride	4	Log	Fail[h]	0.211	0.77	2.303	10	
Chlorobenzene	0			0.83			10	
Chloroform	1	Log	Fail[h]	-0.443	-0.117	2.303	10	
Cyclohexane	0			0.75			NA	
Ethyl benzene	0			0.77			10	
Ethyl ether	0			0.84			10	
Methanol	6	Log	Fail[h]	2.47	2.672	4.605	100	
Methyl ethyl ketone	0			8.46			100	
Methyl isobutyl ketone	0			9.00			100	
Methylene chloride	3	Log	Fail[h]	-0.235	0.012	2.303	10	
o-Xylene	1	None	Fail[h]	0.837	0.983	N/A	10	
m,p-Xylene	0			1.54			10	
Tetrachloroethylene	0			0.74			10	
Toluene	9	Log	Fail[h]	0.478	0.926	4.277	72.02[g]	
Trichloroethylene	0			0.77			10	

NOTES:

[a] A total of 24 samples were collected and analyzed. Analysis was performed for all analytes identified. Samples were not composited. Headspace gas sampling and analysis was conducted on 16 of the 24 containers prior to the addition of trans-1,2-dichloroethylene to the target analyte list.

[b] Identifies the number of samples in which the associated analyte was detected.

[c] Identifies the type of data transformation used, if applicable, to achieve (or better achieve) a normal probability distribution of the data.

Data Summary Report—Table 2: Headspace Gas Summary Data (continued)

NOTES: (continued)

[d] Statistics calculated based on using ½ the MDL for less-than-detectable observations with data transformation as identified (Reference 11). When transformation was applied, the Mean and UCL_{90} values presented are the transformed values (Reference 11). With no detectable concentrations, listed mean reflects average of one-half of reported MDL values for analyte and calculation of standard deviation and UCL_{90} values is not meaningful. With fewer than five detectable concentrations, calculated values for UCL_{90} are subject to potentially large relative error.

[e] RTLs for headspace gas analysis results correspond to the analyte PRQL for analytes that are hazardous waste constituents. "NA" means the analyte is not a WIPP WAP target analyte, but instead a flammable VOC that is analyzed for compliance with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC).

[f] No entry indicates no associated EPA Code assigned to the waste stream based on headspace analysis.

[g] Limit used for evaluation of EPA Hazardous Waste Code for toluene (Reference No. 4).

[h] Data set (with or without transformation) did not pass the test for normality. The data set that most approximated a normal distribution was used for computation of statistics.

Data Summary Report—Table 2: Headspace Gas Summary Data (continued)

WSPF # RF104.01

2B

TENTATIVELY IDENTIFIED COMPOUND (TIC) CHEMICAL ABSTRACTS SERVICE (CAS) Number	Maximum Observed Estimated Concentration (ppmv)	# of Samples Containing TIC
Butyraldehyde, CAS # 123-72-8	6.9	1
Methyl chloride, CAS # 74-87-3	5.5	1

No TIC listed in 40 CFR 261, Appendix VIII was detected in greater than or equal to 25 percent of the waste containers sampled.

Did the data verify the acceptable knowledge? ☑ Yes ☐ No

Data as reported in Data Summary Report – Table 2 confirm acceptable knowledge in that no additional toxicity characteristic volatile organic or F-listed solvent EPA codes, other than those assigned by acceptable knowledge, are applicable.

If not, describe the basis for assigning the EPA Hazardous Waste Codes:

Data Summary Report—Table 6: Exclusion of Prohibited Items

WSPF # RF104.01

The absence of prohibited items is documented through acceptable knowledge. Radiography or visual examination is performed on each container in this waste stream to verify the absence of the following prohibited items:

- Liquids
- Non-radionuclide pyrophoric materials
- Waste incompatible with backfill, seal and panel closure materials, container and packaging materials, shipping container materials, or other wastes
- Explosives or compressed gases
- PCBs in concentrations greater than or equal to 50 ppm
- Waste exhibiting the characteristics of ignitability, corrosivity or reactivity
- Non-mixed hazardous wastes

Newly generated waste is characterized by visual verification (VV) at the time of waste packaging using the visual examination (VE) technique unless the use of radiography in lieu of, or in combination with, visual verification is justified by any of the following criteria:

- Visual verification was conducted during packaging, but was unacceptable,
- Visual verification requires extensive handling of high gram content waste that results in high radioactive exposure for the VV personnel,
- Situations where waste packaging is conducted at numerous locations generating small quantities of transuranic waste requiring a large number of VV personnel, and/or
- Where waste was originally packaged as low-level waste, but subsequently determined to be transuranic.

Each container of waste is certified and shipped only after radiography and/or VE either:

1. Did not identify any prohibited items in the waste container, or
2. All prohibited items found in a waste container by radiography or VE are identified and corrected (i.e., eliminated or removed) through the site non-conformance reporting system.

Data Summary Report—Table 7: Correlation of Container Identification to Batch Data Reports

WSPF # RF104.01

Package No.	Radioassay Data Package	Headspace Sample Batch No.	Headspace VOC Data Package	Radiography Data Package[a]	VE or VV Data Package[b]
D56575	569IP1-DP-013102	04W0111	HGAS-DP-00828	6T2027	
D57099	569IP1-DP-021802	04W0020	HGAS-DP-00741	5T0289	
D60966	440IP1-DP-013004	00W0085	HGAS-DP-000357	6T1928	
D61854	CIQ-98-008	02W0070	HGAS-DP-000351	6T2029	
D62941	440IP1-DP-092603	04W0103	HGAS-DP-00820	6T2038	
D62962	569IP1-DP-110701	01W0198	HVOC-DP-00524	5T0255	
D64013	440IP1-DP-070103	01W0122	HVOC-DP-00456	6T-2165	
D64417	569IP1-DP-110601	01W0212	HVOC-DP-00540	5T-0254	
D64439	440IP1-DP-110703	01W0228	HVOC-DP-00557	6R-049	
D64441	CIQ-01-058	01W0184	HVOC-DP-00511	6T1870	
D64442	CPN-01-037	04W0087	HGAS-DP-00805	6T1870	
D64464	CPN-01-037	03W0030	HGAS-DP-00391	6T1870	
D64473	569IP1-DP-021102	01W0213	HVOC-DP-00541	5T0287	
D64801	440IP1-DP-092603	04W0103	HGAS-DP-00820	6T-2039	
D66112	CPN-00-003	02W0070	HGAS-DP-000351	6T2029	
D67374	569IP1-DP-051402	02W0032	HGAS-DP-00362	6T2011	
D74251	CPN-97-005	01W0216	HVOC-DP-00545	6R032	
DA6767	CIQ-00-035	04W0085	HGAS-DP-00803	6T1692	
DD1728	569IP1-DP-042202	03W0222	HGAS-DP-00567		VV-776-00006
DD6654	569IP1-DP-011503	04W0104	HGAS-DP-00821		VV-707-00036
DD6807	569IP1-DP-012303	04W0103	HGAS-DP-00820		VV-707-00042
DD7070	440IP1-DP-123003	03W0357	HVOC-DP-00685		VV-371-00070
DD7185	440IP1-DP-123003	03W0357	HVOC-DP-00685		VV-371-00068
S01530	440SH1-DP-050902	03W0048	HGAS-DP-00408		VV-771-00032

NOTES:

[a] No entry indicates visual verification (VV) at the time of waste packaging using the visual examination (VE) technique was performed for the container.

[b] No entry indicates container was not selected for visual examination to confirm radiography and did not undergo VV at the time of waste packaging using the VE technique.

Acceptable Knowledge Summary

WSPF # RF104.01

RMRS-WIPP-98-100, Acceptable Knowledge TRM Waste Stream Summaries, Section 7-18: TRM Glass Debris Waste (D005, D008, D009, D022, F001, F002, F005) (attached).

Rocky Flats Environmental Technology Site

ACCEPTABLE KNOWLEDGE INFORMATION

ACCEPTABLE KNOWLEDGE TRU/TRM WASTE STREAM SUMMARIES

RMRS-WIPP-98-100

Section 7.18

TRM Glass Debris Wastes

(D005, D008, D009, D022, F001, F002, F005)

Profile No. RF104.01

Revision 1

Reviewed for Classification/UCNI
By: Unclassified Not UCNI
Reference Exemption Number CEX-032-00
Date: April 27, 2004

Approval signatures in Site Document Control history file

7.18 TRM Glass Debris Wastes (D005, D008, D009, D022, F001, F002, F005) Profile No. RF104.01

Acceptable Knowledge Waste Stream Summary

Waste Stream Name: TRM Glass Debris Wastes (D005, D008, D009, D022, F001, F002, F005)

Generation Buildings: Buildings 371, 440, 559, 707, 771, 776, 777, and 779 [1,10]

Waste Stream Volume (Retrievably Stored): 159 55-Gallon Drums [1]

Generation Dates (Retrievably Stored): October 1975 – July 2001 [1]

Waste Stream Volume (Newly Generated): 59 55-Gallon Drums and 5 Standard Waste Boxes [1]

Generation Dates (Newly Generated): March 2002 – October 2003 [1]

Waste Stream Volume (Projected): 3 55-Gallon Drums and 1 Standard Waste Box [1,2]

Generation Dates (Projected): March 2004 to June 2004 [1,2]

TRUCON Content Codes [3]: RF 118A/218A, RF 118B/218B, RF 118C/218C, RF 118D/218D, RF 118E/218E, RF 118F/218F, RF 118H/218H, RF 118I/218I, RF 118N/218N, RF 118T/218T

Process Knowledge Demonstrates Flammable VOCs in Headspace < 500 ppm: No (see Sec. 7.18.6)

7.18.1 WIPP Transuranic Waste Baseline Inventory Report Information [4]

WIPP Identification Numbers: RF104.01

Summary Category Group: S5000 Waste Matrix Code Group: Inorganic Non-Metal Waste

Waste Matrix Code: S5122 Waste Stream Name: TRM Glass Debris Waste (D005, D008, D009, D022, F001, F002, F005)

Description from the WTWBIR: This waste consists of glass from analytical laboratories, recovery processes, ceramics, glovebox windows, crushed glass light bulbs, and leaded glass.

NOTE: This waste stream is not identified in the WTWBIR but differs only in hazardous waste codes from other glass waste streams, RF-MT0440, RF-MT0442, RF-MT0444, and RF-MT0855. The WIPP ID assigned corresponds to the Waste Stream Profile Number. The Summary Category Group, Waste Matrix Code Group, and Waste Matrix Code are based on acceptable knowledge as provided in Section 7.18.2.

7.18.2 Waste Stream Description

TRM glass debris wastes were generated from a variety of operations in support of weapons fabrication and manufacturing including plutonium production, recovery, laboratory operations, research and development, maintenance and utility operations, waste treatment and residue repackaging operations, and D&D of the facilities and equipment utilized in these operations. This waste is generated from similar activities, and is similar in material, physical form, and hazardous constituents, and is therefore considered a single waste stream. Table 7.18-1 presents the waste matrix code and waste material parameters for glass debris wastes.[5]

Table 7.18-1, Glass Debris Wastes Description

IDC	Description	Waste Matrix Code	Waste Material Parameters	Weight % (Average)
440	Glass (Except Raschig Rings)	S5122, Glass Debris	Other Inorganic Material	100%
441	Unleached Raschig Rings	S5122, Glass Debris	Other Inorganic Material	100%
442	Leached Raschig Rings	S5122, Glass Debris	Other Inorganic Material	100%
443	Raschig Rings, Solvent Contaminated	S5122, Glass Debris	Other Inorganic Material	100%
444	Ground/Leaded Glass	S5122, Glass Debris	Other Inorganic Material	100%
855	Ground Glass	S5122, Glass Debris	Other Inorganic Material	100%

Glass (Except Raschig Rings): Primarily glassware from analytical and recovery processes. Glass waste items include, but are not limited to, containers (e.g., beakers, flasks, graduated cylinders, sample bottles, pipettes, and vials), rods, funnels, ion-exchange columns, and other glass instruments and equipment. This waste material also includes glass glovebox windows (non-leaded glass) and ancillary equipment (e.g., metal window frames and other metal debris items, small quantities [less than one weight percent] of rubber gasket material, etc.) standard light bulbs and ceramic materials. Fluorescent light bulbs were formerly included with this material; however, they are now generated as ground glass.[6,7,19,21,25]

Unleached Raschig Rings: Borosilicate glass rings used to maintain subcritical conditions in fissile solution storage tanks. The rings were replaced if they were broken or otherwise damaged, or if the assay of the tank exceeded acceptable limits. The rings were assayed, and if the material count was below the economic discard limit (EDL), they were packaged without leaching.[6]

Leached Raschig Rings: Raschig rings leached with dilute nitric acid or water prior to being removed from their tanks.[6]

Raschig Rings, Solvent Contaminated: Raschig rings rinsed with carbon tetrachloride prior to being removed from their tanks.[6,14,19]

Ground/Leaded Glass: Leaded glass used throughout the plutonium- and uranium-processing areas. The material was generated when glovebox glass was replaced and may also include ancillary equipment/material such as metal window frames and other metal debris items and small quantities (less than one weight percent) of rubber gasket material. This material may also contain radioactive fluorescent bulbs generated inside the Protected Area.[6,9,14,16,19,21,25]

Ground Glass: Radioactive fluorescent light bulbs that are broken or crushed.[7,9,16,21,25]

7.18.3 Areas of Operation

TRM glass debris wastes in this waste stream are generated by the following defense operations:[5,6,7,9,10,12,14,16,19,21,22]

- Plutonium Production
- Plutonium Recovery
- Laboratory Operations
- Research and Development
- Maintenance and Utilities
- Waste Treatment and Residue Repackaging
- Decontamination and Decommissioning Operations (D&D)

7.18.4 Generation Processes

TRM glass debris wastes were generated from nearly every operation on site in support of weapons fabrication and manufacturing including plutonium production, recovery, laboratory operations, research and development, maintenance and utility operations, waste treatment and residue repackaging operations, and D&D of the facilities and equipment utilized in these operations.

Historical production, recovery, laboratory, and R&D operations used gloveboxes with leaded glass windows as shielding to reduce exposure of workers to elevated levels of penetrating radiation (primarily gamma radiation). These same historical operations utilized Raschig rings in process and/or liquid waste storage tanks for criticality control. The majority of glass debris waste was generated from maintenance and utility operations. The leaded glass or window components became waste due to replacement, modification, or decommissioning activities. Raschig rings were replaced if they were broken or otherwise damaged, or if the fissile content of the liquid in the storage tank exceeded acceptable limits. Other maintenance and utility operations generated glass debris in the form of contaminated incandescent or fluorescent light bulbs. Laboratory and R&D operations generated glass debris in the form of contaminated glassware (e.g., empty or broken beakers, flasks, graduated cylinders, sample bottles, pipettes, and vials), broken

thermometers, rods, funnels, ion-exchange columns, and other glass instruments and equipment. Process flow diagrams for historical production, recovery, laboratory, R&D, and maintenance and utility operations are provided in the active and archived WSRIC Books.[6,7,8,11,12,13,14,15,16,17,18,19,20]

More recently, glass debris waste is being generated during D&D operations in Buildings 371, 707, 776, 777, and 779. D&D activities include the physical isolation and removal of contaminated gloveboxes, equipment, machinery, furnishings, and support systems. This includes removal and size reduction of glovebox internals, glovebox windows, process piping and supports, tanks (including removal of Raschig rings) and ancillary equipment, and other fixed equipment such as ducting, wires, conduits, electrical panels and cabinets. Gloveboxes and equipment are size reduced as necessary and packaged for shipment to WIPP.[6,9,14,19,21,22]

Glass debris waste from historical operations and more recent activities is repackaged in Buildings 371, 440, 771, 776, and 777 to meet residue safe-storage criteria and WIPP WAC and WAP requirements. In Building 371, drums of glass debris waste are also overpacked in Standard Waste Boxes to meet WIPP requirements.[9,10,16,19]

A more detailed description of each of the D&D and repackaging processes and process flow diagrams can be found in the WSRIC Building Books.[9,10,14,16,19,21,22]

7.18.5 RCRA Characterization

This waste stream is characterized as a mixed waste. As described in Section 7.18.2, this waste is generated from similar activities, and is similar in material, physical form, and hazardous constituents, and is therefore considered a single waste stream. The waste stream as a whole is assigned EPA hazardous waste numbers D005, D008, D009, D022, F001, F002, and F005. For on site storage, the individual containers of mixed waste in this waste stream are assigned a subset of these EPA hazardous waste numbers because the BWR Baseline Book Subpopulations and WSRIC Process Numbers used by the site do not define waste streams in accordance with the WAP. The specific BWR Baseline Book Subpopulations and WSRIC Process Numbers associated with glass debris wastes in this waste stream are listed in the WEMS AK Waste Stream Summary for Profile Number RF104.01.[23]

Visual examination of waste contents at the time of packaging and/or RTR is used to verify that the waste stream does not contain liquid waste, explosives, non-radionuclide pyrophoric materials, compressed gasses, or reactive waste. Therefore, this waste stream does not exhibit the characteristics of ignitability (D001), corrosivity (D002), or reactivity (D003).

The materials in this waste stream are toxicity characteristic for RCRA metals and organics. Barium, lead, and mercury are identified as hazardous constituents in the waste. Based on analytical data, leaded glass contains lead and barium in quantities sufficient to exhibit the characteristics of toxicity for these metals. This waste stream also includes glass with bonded lead, glass cathode ray tube monitors (containing lead), and incandescent and fluorescent light bulbs (containing mercury and/or lead). Mercury is also present in this waste stream as a contaminant on broken thermometers, or glassware used for handling elemental mercury or mercury spill cleanup materials and include amalgam or sponges used in the cleanup. Therefore, D005, D008, and D009 are assigned to glass debris materials in this waste stream.[6,7,9,10,12,14,16,19,21,22]

The only toxicity characteristic organic constituent identified in this waste stream consists of chloroform. Chloroform was detected in concentrations above the PRQL in the individual container headspace of some containers. Therefore D022 is assigned to glass debris materials in this waste stream.[6]

The materials in this waste stream are mixed with F-listed constituents. Acetone, carbon tetrachloride, ethyl acetate, ethyl benzene, Freon TF (1,1,2-trichloro-1,2,2-trifluoroethane), methanol, methyl ethyl ketone, methylene chloride, pyridine, toluene, 1,1,1-trichloroethane, and xylene were used as solvents for laboratory operations, sample etching, machining, cleaning, and or degreasing. This waste stream includes glass debris contaminated from storage and handling of these solvents. This waste stream also includes containers that were originally assigned to a different waste stream by AK, but were subsequently segregated into this waste stream after completion of headspace gas sampling/analysis. F001, F002, and/or F005 listed solvents were detected in concentrations above the PRQL in the individual container headspace of these segregated containers. Therefore, these wastes are assigned EPA hazardous waste numbers F001, F002, and F005.[6,14,19]

Although F003 listed solvents such as acetone, ethyl acetate, ethyl benzene, methanol, and xylene were used in production and laboratory operations, these solvents are listed solely for ignitability. Because the glass debris waste is a solid and is not ignitable, EPA hazardous waste number F003 is not assigned to this waste stream.

No discarded chemical products, off-specification species, chemical residues, and spill residues thereof (40 CFR 261.33) were included in this waste stream and no hazardous waste from specific sources (40 CFR 261.32) was generated at the site. Therefore, no K-, U-, or P-listings have been applied to this waste stream.[6,7,9,10,12,14,16,19,21,22]

Beryllium parts were used in the manufacture/assembly of weapons components, and residual beryllium contamination of plutonium parts may have occurred. Glass debris associated with these operations may have been contaminated with beryllium and therefore, trace quantities (less than one weight percent) of beryllium may be present in the waste stream. Any beryllium present is as a contaminant of the process and not as

unused commercial chemical product, and therefore is not a P015-listed waste.[6,9,12,14,19,22]

The glass debris waste streams generated at RFETS and sent to the INEEL for storage have the same IDCs but are considered different waste streams because of the EPA hazardous waste numbers assigned. The INEEL waste streams (Local ID Numbers ID-RFO-440T, ID-RFO-441T, and ID-RFO-442T) were generated and shipped to INEEL prior to the full implementation of RCRA and therefore, EPA hazardous waste numbers were assigned to each IDC as a whole.[4]

Headspace gas sampling and analysis of the first lot of containers assigned to this waste stream by AK detected 11 VOCs. Statistics were calculated based on using one-half the method detection limit (MDL) for less-than-detectable observations with data transformation applied where appropriate. Using this "WIPP directed" method, the calculated 90 percent upper confidence limit (UCL_{90}) of the mean concentrations for none of the analytes were found to exceed their associated PRQL value. Consequently, no VOC EPA hazardous waste codes were confirmed by headspace gas sampling/analysis; however, no changes to the AK assigned EPA hazardous waste codes were made based on this data (i.e., all EPA hazardous waste codes assigned by AK are retained for the subject waste stream).[24]

7.18.6 Transportation

The payload containers in this waste stream must also comply with the TRUPACT-II Authorized Methods for Payload Control (TRAMPAC) requirements. Flammable volatile organic compounds (VOCs) including acetone, ethyl benzene, methanol, methyl ethyl ketone, toluene, and xylenes were identified in this waste stream based on the descriptions in the *BWR Baseline Book and WSRIC Building Books*. Therefore, flammable VOCs in the payload container headspace have the potential to exceed 500 ppm. All payload containers, including those that exceed 500 ppm flammable VOCs in the headspace gas, are evaluated for compliance with applicable TRAMPAC requirements using the eTRAMPAC system prior to shipment.[6, 14,19]

7.18.7 Radionuclides

Table 7.18-2 summarizes the radionuclides potentially present in TRM glass debris wastes.[5]

Table 7.18-2, Glass Debris Wastes Radionuclides

IDC	Description	Radionuclides[1,2,3]	Rationale
440	Glass (Except Raschig Rings)	WG Pu, Am-241, DU, EU, Np-237, Am-243	IDC generated in nearly every TRU building; radionuclides dependent on generation process
441	Unleached Raschig Rings	WG Pu, Am-241, DU, EU, Np-237, Am-243	IDC generated by several processes in Building 371 and Building 771; radionuclides dependent on generation process
443	Leached Raschig Rings	WG Pu, Am-241, DU, EU, Np-237, Am-243	IDC generated in several buildings; radionuclides dependent on generation process
443	Leached Raschig Rings, Solvent Contaminated	WG Pu, EU, Am-243	IDC from tanks in Building 777 containing oil/solvent mixture used for machining.
444	Leaded Glass	WG Pu, Am-241, DU, EU, Np-237, Am-243	IDC generated in every TRU building; radionuclides dependent on generation process
855	Ground Glass	WG Pu, Am-241, DU, EU, Np-237, Am-243	IDC generated in every TRU building; radionuclides dependent on generation process

Key:

WG Pu	weapons-grade plutonium
Am-241	americium-241
DU	depleted uranium
EU	enriched uranium
Np-237	neptunium-237
Am-243	americium-243

Notes:

1. Am-243 was not initially predicted to be present by AK; however, it has been identified by NDA and is therefore added as a potential radionuclide in this waste stream.
2. Am-241 is indicated only for IDCs (unless noted otherwise) in which americium operations were performed (e.g., molten salt extraction). Am-241 will be present in all IDCs but is not indicated if it is expected to be present only due to plutonium-241 decay. However Am-241 will be part of the NDA evaluations per the CH-WAC.
3. DU and EU are indicated only for IDCs in which uranium could be present in the waste. However uranium isotopes will be present in all IDCs as a decay product and U-234 and U-238 are evaluated by or calculated from radioassay as a CH-WAC requirement.

7.18.8 References

1. WASTREN 2004. Interoffice Memorandum from Scott Smith to Waste Records Center. Current and Projected Waste Volumes for TRM Glass Debris Waste (D005, D008, D009, D022, F001, F002, F005), SMS-005-2004. March 25, 2004.

2. WASTREN 2003. Interoffice Memorandum from Jeff Harrison to Eric D'Amico. Projected Waste Stream Volumes and Generation Dates for TRU and TRM Waste, JLH-011-2003. February 12, 2003.

3. RFETS 2004. Transuranic (TRU) Waste Management Manual, Version 7, 1-MAN-008-WM-001.

4. DOE 1995. WIPP Transuranic Waste Baseline Inventory Report, Revision 2. DOE/CAO-95-1121.

5. RFETS 2004. RFETS TRU Waste Acceptable Knowledge Supplemental Information. RF/RMRS-97-018, Revision 11.

6. RFETS 2004. Backlog Waste Reassessment Baseline Book, Waste Form 17, Glass, Ground Glass, and Plexiglas.

7. RFETS 2004. Backlog Waste Reassessment Baseline Book, Waste Form 27, Fluorescent Bulbs.

8. EG&G 1993. Waste Stream and Residue Identification and Characterization, Building 371, Version 3.2.

9. RFETS 2004. Waste Stream and Residue Identification and Characterization, Building 371, Version 7.0.

10. RFETS 2003. Waste Stream and Residue Identification and Characterization, Building 440STOR, Version 7.0.

11. EG&G 1993. Waste Stream and Residue Identification and Characterization, Building 559, Version 3.2.

12. RFETS 2004. Waste Stream and Residue Identification and Characterization, Building 559, Version 7.0.

13. EG&G 1992. Waste Stream and Residue Identification and Characterization, Building 707, Version 3.2.

14. RFETS 2004. Waste Stream and Residue Identification and Characterization, Building 707, Version 7.0.

15. EG&G 1992. Waste Stream and Residue Identification and Characterization, Building 771, Version 3.2.

16. RFETS 2003. Waste Stream and Residue Identification and Characterization, Building 771, Version 7.0.

17. EG&G 1991. Waste Stream and Residue Identification and Characterization, Building 776, Version 3.2.

18. EG&G 1991. Waste Stream and Residue Identification and Characterization, Building 777, Version 3.2.

19. RFETS 2004. Waste Stream and Residue Identification and Characterization, Building 776/777, Version 7.0.

20. EG&G 1991. Waste Stream and Residue Identification and Characterization, Building 779, Version 3.2.

21. RFETS 2000. Waste Stream and Residue Identification and Characterization, Building 779, Version 6.0.

22. RFETS 2004. Waste Stream and Residue Identification and Characterization, Decontamination/Decommissioning WSRIC Building Book, Version 7.0.

23. RFETS 2004. Waste and Environmental Management System (WEMS) Database.

24. Interoffice Memorandum from Douglas K. Sullivan to Eric L. D'Amico, Headspace Gas Analysis Data Evaluation Report For Waste Stream Profile RF104.01 Lot 1, DKS-008-04, April 2004.

25. RFETS 2004. Solid Radioactive Waste Packing Requirements Manual, 1-M12-WO-4034, Version 10.